REMARKS

Claims 1-65 are pending in the application. New Claims 53-65 have been added. Support for the new claims may be found throughout the application as filed including, but not limited to:

Claims 53, 54, 58, 59, 62 and 63: Claims 2, 16 and 41, as originally filed.

Claims 55-57, 60, 61, 64 and 65: paragraphs 0036-0039.

In view of the following remarks, reconsideration and withdrawal of the rejections to the application in the Office Action is respectfully requested.

I. Rejection of Claims 1-52

In the Office Action Claims 1-52 were rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claims 1-33 of U.S. Patent No. 6,791,104 (hereinafter "the '104 Patent").

In support of the rejection of Claims 1-52, the Office Action states:

> U.S. Patent No. 6,791,104 fails to disclose providing that the substrate be made of InP. However, U.S. Patent No. 6,791,104 does disclose providing a GaAs substrate. In addition, U.S. Patent No. 6,791,104 discloses that conventional optoelectronic devices can be fabricated with InP substrates having an emission wavelengths in the 1.55 um. (Column 1, lines 39-57.)
>
> Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made for U.S. Patent No. 6,791,104 to provide a InP substrate in place of the GaAs substrate because U.S. Patent No. 6,791,104 discloses that conventional optoelectronic devicees can be fabricated with InP substrates having an emission wavelengths in the 1.55 um and the use of the a InP substrate versus a GaAs substrate would have been a mere design choice as clearly stated in the "Background Of The Invention" in U.S. Patent No. 6,791,104. (Column 1, lines 39-57).

Applicants respectfully traverse.

In order to establish a prima facie case of obviousness based on a single prior art reference, there must be some suggestion or motivation, either in the reference itself, or in the knowledge generally available to one of ordinary skill in the art, to modify the reference. In addition, the prior art reference must teach or suggest all the claim limitations of the rejected claims. (MPEP 2143)

A prima facie case of obviousness may be rebutted by showing that the prior art, in any material respect, teaches away from the claimed invention. (MPEP 2144.05 III.) A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be led in a direction divergent from the path taken by the applicant or when the reference suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the results sought by the applicant. (See *In re Gurley*, 31 USPQ2d 1130, 1131 (Fed. Cir. 1994).) Furthermore, "[k]nown disadvantages in old devices which would naturally discourage search for new inventions may be taken into account in determining obviousness." (MPEP 2145 X.D.3. citing *United States v. Adams*, 383 U.S. 39, 52 (1966)).

As noted in the Office Action, the Background section of the '104 Patent teaches that "Conventional active regions for 1.55 μm lasers ... are based on InGaAs or InGaAsP multiple quantum wells (MQWs) on InP substrates." (Col. 1, lines 49-52.) However, when read in the context of the obviousness standard, outlined above, the language from the '104 Patent cited in the Office Action actually teaches away from modifying the optoelectronic device of the '104 Patent "to provide a InP substrate in place of the GaAs substrate," as suggested in the Office Action. This is because, the language cited from the Background section of the '104 Patent (i.e., Col. 1, lines 39-57) is aimed at disclosing known disadvantages in conventional 1.55 μm lasers. Specifically, the '104 Patent notes that the InP-based lasers: 1) are inherently temperature sensitive, which renders them unsuitable for a number of applications (col. 1, lines 52-54); and 2) require sophisticated and challenging fabrication processes (col. 1, lines 39-48). As acknowledged in the '104 Patent, these known disadvantages of InP-based lasers have diverted

research toward the use of GaAs substrates, instead of InP substrates. (Col. 1, lines 59-64.) Consistent with this new direction of research, the result sought by the applicants of the '104 Patent was to provide a laser using a GaAs substrate that is simple and inexpensive in comparison with conventional 1.55 μm lasers (i.e., in comparison to InP-based lasers). (Col. 1, line 66 – col. 2, line 3.) It follows that, upon reading the '104 Patent, a person of ordinary skill in the art would be discouraged from replacing the GaAs substrate of the '104 device with an InP substrate, since the result sought by the '104 device is to overcome the disadvantages associated with lasers having an InP substrate. Because the Background section of the '104 Patent discourages the use of InP as a substrate, it cannot fairly be maintained that "the use of a InP substrate versus a GaAs substrate would have been a mere design choice," as asserted in the Office Action. Therefore, the Office Action has failed to establish a prima facie case of obviousness and Applicants respectfully request that the rejection of all of the pending claims be withdrawn.

Regarding Claims 4, 5, 17, 42 and 43, Applicants further submit that the Office Action fails to establish a prima facie case of obviousness because the '104 Patent does not teach or suggest each and every limitation of these claims. Specifically, the '104 Patent fails to teach or suggest a type II quantum well structure wherein the electron quantum well layer of the active region is in compressive strain. To the contrary, the electron quantum well layer in the '104 Patent is described throughout the disclosure as being in either tensile strain or lattice matched with respect to the substrate, and the Office Action fails to identify any language in the '104 Patent that would suggest the desirability of modifying the structures taught therein to provide a compressively strained electron quantum well layer. For this additional reason, Applicants respectfully request that the rejection of these claims be withdrawn.

Regarding independent Claim 27, and dependent Claims 28-38 which depend therefrom, Applicants respectfully submit that the Office Action fails to establish a prima facie case of obviousness because the '104 Patent does not teach or suggest each and every limitation of these claims. Specifically, the '104 Patent fails to teach or suggest an optoelectronic device with a type

II quantum well structure having "a electron quantum well layer of InAsN on each side of the hole quantum well layer," as recited in independent Claim 27. In fact, Applicants were unable to find (and the Office Action failed to point out) any mention of InAsN in the '104 Patent. For this additional reason, Applicants respectfully request that the rejection of these claims be withdrawn.

II. New Claims 53-65

Applicants respectfully note that new claims 53-65 are also novel and unobvious over the '104 Patent because the '104 Patent fails to teach or suggest each and every claim limitation of the new claims. Specifically, with regard to claims 54, 59 and 63, the '104 Patent fails to teach or suggest an optoelectronic device with a type II quantum well structure having a electron quantum well layer of InAsN. With regard to claims 53, 58 and 62 the '104 Patent fails to teach or suggest an optoelectronic device with a type II quantum well structure having a hole quantum well layer of InGaAsSb. Regarding claims 55, 60 and 65 the '104 Patent fails to teach or suggest an optoelectronic device that includes optical confinement layers composed of InP or InGaAsSb. Finally, with regard to claims 56, 61 and 64, the '104 Patent fails to teach or suggest an optoelectronic device that includes cladding layers composed of InP or AlGaInAs.

In view of the foregoing remarks, Applicants respectfully submit that all of the claims remaining in the application are in condition for allowance and favorable action thereon is respectfully solicited.

Respectfully submitted,

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